DOCUMENT RESUME

ED 472 904 SE 067 295

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TITLE	Using Electronic Classrooms and the World Wide Web to Support Science Teaching and Learning: Interactive Session Summary.
PUB DATE	2001-06-00
NOTE	8p.; In: Proceedings of the Annual Meeting of the Association for the Education of Teachers in Science (Costa Mesa, CA, January 18-21, 2001). For full proceedings, see ED 453 083.
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	*Computer Uses in Education; *Educational Technology; Higher Education; *Information Technology; Professional Development; *Science Instruction; Teacher Education; *Teaching Methods; World Wide Web

ABSTRACT

Since technology use in schools has been increasing, teachers want to maximize its use in their classroom to increase student learning. Therefore, accreditation requirements for colleges include integrating computer and information technology with teacher education and professional development programs. This paper describes different models for infusing technology into teaching by faculty and the teaching experience of a panel member in a preservice methods class. (YDS)

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USING ELECTRONIC CLASSROOMS AND THE WORLD WIDE WEB TO SUPPORT SCIENCE TEACHING AND LEARNING: INTERACTIVE SESSION SUMMARY

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Recently, Colleges of Education across the nation have been charged with infusing computer and information technologies into their teacher education programs. This charge has mainly come through accreditation organizations such as INTASC and NCATE. Essentially, colleges that seek reaccreditation must meet standards that include computer and information technologies in significant ways in teacher preparation and professional development programs.

One rationale for this charge is that these technologies are finding increasing use in the schools in which preservice and inservice teachers work. Meeting the charge of the accrediting organizations can also be seen as relevant to what teachers are experiencing in the workplace. School districts want teachers who can use technology to maximize learning opportunities for students.

As a result of these two factors, science teacher educators must model how technology can be infused into the classroom culture. Some have been using the World Wide Web as an instructional resource room, posting syllabi and other materials and establishing links to specific web sites. Others have worked to create more interactive situations that mirror and extend the classroom environment, including both interactive and management aspects of a course. Of late, the development and proliferation of more complex web-based courseware has made interactivity more possible for professionals

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who lack extensive computer programming experience. In some situations, teacher educators are using this technology to catalyze and monitor discussions and other interactions around critical issues in teaching and learning.

Each of the presenters in this panel has used a different approach for creating and using web-based course enhancements. Michael Beeth received training in MS Front Page, and has utilized web pages for syllabi, and links to other course-related resources, for several years. Marcia Fetters, with no formal training in Web design and programming, has used the free Nicenet courseware extensively, for management as well as interaction. Paul Vellom has used web resources in methods courses for several years, and recently attended a WebCT workshop and began using WebCT courseware to extend preservice teachers' learning around critical issues such as classroom management. The presenters discussed these uses of the Web, and then started a conversation with participants about the use of on-line classrooms and materials, with the goal of understanding both the potential and the limitations of using the Web in science teacher education.

Making the Web Work as a Resource

Beginning a couple of years ago, Dr. Beeth has developed web pages for each of his course syllabi, so that they are generally available to his students at any time. Over time, he has reworked these syllabi each time a set of courses is complete, mainly adding links to such web-based educational resources as, 1) the Eisenhower National Clearinghouse for Science and Mathematics Education and the ERIC Clearinghouse for Science, Mathematics, and Environmental Education, 2) sites for electronic journals and proceedings from research and teacher conferences, 3) sites which describe and extend

community-based resources, and 4) sites having to do with specific science topic areas such as genetics, ecology, or electricity. In addition, Michael has increasingly utilized electronic formats for submission of student work and for communications with students. Dr. Beeth stated that his first effort of getting a lot of materials available on the web then led him to think more about interactivity. Those first materials weren't very interactive, and this led him to think about creating that interactivity, both in the websites he designs and in finding other resources for teacher education. He discussed some of the successes and barriers that he has encountered in using the web effectively as an instructional resource in preservice, inservice, and doctoral programs.

A Home on the Web

Creating an on-line classroom/course became a doable reality for this instructor after hearing Dr. Jack Hassard from Georgia State University describe how he used a free service called Nicenet to create on-line classrooms to support his students. At this conference a variety of ideas were shared with middle and high school science teachers about how this could be made an integral part of teaching and learning.

Nicenet's Internet Classroom Assistant (version 2)(ICA2) was released in 1998, and billed as a "free web-based learning environment for classrooms, distance learning programs and collaborative academic projects"(Nicenet, 1998). The press release provided the following information about the ICA: "a sophisticated communication tool that brings powerful World-Wide-Web based conferencing, personal messaging, document sharing, scheduling and link/resource sharing to a variety of learning environments. Nicenet provides the ICA free of charge with no advertising.

The ICA runs on Nicenet's server and requires a web browser running on any platform and an Internet connection - there is no software to download and no server to configure. The ICA was intentionally designed as a low graphics environment to decrease the load time of each page. The queries used to fill the site with class-specific data take less than a second. A fully dynamic site, the ICA is customized at two different levels: 1.) the user and 2.) the class. Anyone can set up a class in minutes and allow others to join. After login, users are presented with a "heads-up" display of class resources."

Unlike some of the more powerful on-line courseware, Nicenet does not support graphics, nor does it support on-line chat rooms. While to some this may be disappointing, this is also one of it's strengths. Individuals with lower-end machines or slow modems can have easier access to the web site and associated materials.

Setting up a class is quick and easy, and takes just a few minutes. Once you have set up a class you receive an e-mail that has your "class key" in it. Have students go to the Nicenet website and join the class. They will be asked for the class key and to set up a Nicenet identity. A nice part of this is the instructor doesn't have to enter the student information!

Handling Critical Issues in Teaching Using the Web

This panel member presented a brief overview of his experience teaching a preservice methods class over two years. During the first year, the web was used as a resource for information in several areas, including examples of lessons, current research on teaching and learning in specific science topics, and community-based resources. During this same year, in-class discussions of critical issues in teaching (such as assessment, classroom management, and the impact of standardized testing) were often

dominated by a few individuals. While Dr. Vellom held goals of all students engaging in thoughtful reflection leading to informed decisions on these issues, it wasn't happening.

In the second year, WebCT was introduced stepwise as a management tool, as well as to extend and monitor classroom discussions of critical issues. Threaded discussion was initiated on these issues, with the following benefits: 1) level playing field in which all were required to participate, and those who normally dominate in-class discussions were limited by a class maximum of 5 postings, 2) thoughtful initial responses (for the most part) covering more ground than typical in-class responses, 3) many students got responses to their initial postings, and these were mostly positive, 4) instructor was able to monitor breadth and depth, and consider carefully before responding to individuals or the group. Some limitations of this approach were also shared: 1) some students had difficulties related to Web use, such as finding/making time or logging on incorrectly, 2) some very good initial postings that dealt with important issues were not the object of responses, 3) the discussion did not occur in real time, so the instructor was not aware of 'context clues' that can be important in a face-to-face encounter.

WebCT (Web Course Tools) is commercially available, and can be used for online courses as well as course enhancement. Each WebCT course has the following built-in features: 1) a welcome page, accessible to any web user, 2) username identity system used to give students access to all course in which they are enrolled, 3) areas for course content (lecture hall), and 4)areas for links to other URL's, interactive modules using flash, etc.

Web CT communication tools include synchronous (chat, whiteboard) and asynchronous (email, discussion forums, student presentations, student web pages). WebCT also includes student management functions, including online quizzes with scoring functions, a gradebook with student reporting functions, and student tracking for page use, time, and postings to forums.

Course management functions include TA or co/teacher access, and chat and discussion forums can be compiled and downloaded as text files for research, etc.

Discussion forum use: The Assignment

I asked students to pick a memorable event from the introductory general methods course and to tell why it was memorable. I asked that they then create a balanced analysis with costs and benefits, and tell what they would do as a result of the activity or event. Also, in order to facilitate good discussion, I required each student to make one initial posting and one response to a posting, with a maximum of 5 postings.

Discussion forum use: What happened:

Fifty seven out of 58 students were able to post with no additional help from the instructor. To a large degree, the initial postings mimicked earlier non-web reflective writings (see framework below). In their responses, students were polite and caring (mostly). However, analysis revealed very little evidence of moving beyond the specific task on initial use, i.e. no synthesis of a discussion thread, etc. One student chose to criticize others for incorrect thread issues (very few of these).

Other course evaluations revealed:

Thirteen of 58 students marked WebCT as the best part of the course. When asked specifically about WebCT discussions, a common theme was the desire for

instructor participation, validation, and feedback. A teaching principle that emerged from this experience: structure interactions carefully to get what you want from your students

Implications

This interactive session was designed to assist us and others in meeting the challenge to infuse technology into science teacher education. The WWW presents opportunities to change practice in science teacher education to better address the needs of preservice and inservice teachers, and to reflect the reality of the increasing use of computer technologies in teaching and learning environments.

References and WWW Resources:

Nicenet (1998). http://www.nicenet.org/ica/ica_info.cfm

http://www.nicenet.org/

http://webct.com

http://enc.org

http://ericse.org

http://www.gsu.edu/~mstjrh/mindsonscience.html

http://www/blackboard.com/

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